

WHAT IS CLAIMED IS:

1. An electroplating solution for plating tin-copper alloy solder coatings comprising:
a sulfonic acid electrolyte;
a tin compound soluble in the sulfonic acid to form a tin sulfonate;
a copper compound soluble in the sulfonic acid to form a copper sulfonate;
a non-ionic surfactant;
a satin brightener; and
an antioxidant.
2. The electroplating solution of claim 1 wherein the sulfonic acid electrolyte comprises an alkane or alkanol sulfonic acid containing 1-5 carbon atoms.
3. The electroplating solution of claim 1 wherein the sulfonic acid electrolyte comprises methanesulfonic acid.
4. The electroplating solution of claim 1 wherein the tin compound comprises tin methanesulfonate.
5. The electroplating solution of claim 1 wherein the copper compound comprises copper methanesulfonate.
6. The electroplating solution of claim 1 wherein the non-ionic surfactant comprises a polyethylene glycol.

7. The electroplating solution of claim 1 wherein the non-ionic surfactant comprises polyoxyethylene-block-polyoxypropylene with molecular weight between 2000 and 10,000.

8. The electroplating solution of claim 1 wherein the satin brightener comprises an aromatic amine or a tertiary amine.

9. The electroplating solution of claim 1 wherein the satin brightener comprises oxidized 1-phenyl-3-parazolidinone.

10. The electroplating solution of claim 1 wherein the antioxidant comprises a catechol.